I-10/SR 85 CORRIDOR PROFILE STUDY

I-10/SR 85, CALIFORNIA STATE LINE TO I-8

ADOT Work Task No. MPD 043-15
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Draft Working Paper 3: Corridor Performance Goals and Objectives

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PREPARED FOR:

Arizona Department of Transportation

PREPARED BY:

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LIST OF ABBREVIATIONS

ABBREVIATION	NAME
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
APS	Arizona Public Service
AZTDM	Arizona Travel Demand Model
BCA	Benefit Cost Analysis
BqAZ	Building a Quality Arizona
BLM	Bureau of Land Management
CANAMEX	Planned future roadway system that will connect Mexico to Canada
COF	Corridors of the Future
COG	Council of Governments
CPS	Corridor Profile Study
CRIT	Colorado River Indian Tribes
DCR	Design Concept Report
DMS	Dynamic Message Sign
FHWA	Federal Highway Administration
FY	Fiscal Year
I	Interstate
LRTP	Long Range Transportation Plan
MAG	Maricopa Association of Governments
MP	Milepost
MPD	Multimodal Planning Division
MPO	Metropolitan Planning Organization
NFN	National Freight Network
N/A	Not Applicable
OP	Overpass
PA	Project Assessment
POE	Port-of-Entry
P2P	Planning to Programming
SERI	Species of Economic and Recreational Importance
SGCN	Species of Greatest Conservation Need
SHCG	Species and Habitat Conservation Guide
SHS	State Highway System
SHSP	Strategic Highway Safety Plan
SR	State Route
SWAP	State Wildlife Action Plan
TAC	Technical Advisory Committee
TI	Traffic Interchange
TPTI	Truck Planning Time Index
TTTI	Truck Travel Time Index
UP	Underpass
USDOT	United States Department of Transportation
WACOG	Western Arizona Council of Governments

1.0 INTRODUCTION

The Arizona Department of Transportation (ADOT) is the lead agency for this corridor profile study of Interstate 10 (I-10)/ State Route 85 (SR 85), between the California State Line and Interstate 8 (I-8). This study will look at key performance measures relative to the I-10/SR 85 corridor, and use those as a means to prioritize future improvements in areas that show critical needs. The intent of the corridor profile program, and of the Planning to Programming process, is to conduct performance-based planning to identify areas of need and make the most efficient use of available funding to provide an efficient transportation network. ADOT is conducting eleven corridor profile studies. The eleven corridors are being evaluated within three separate groupings.

The first three studies (Round 1) began in spring 2014, and encompass:

- I-17: SR 101L to I-40
- I-19: Mexico International Border to I-10
- I-40: California State Line to I-17

The second round (Round 2) of studies, initiated in spring 2015, includes:

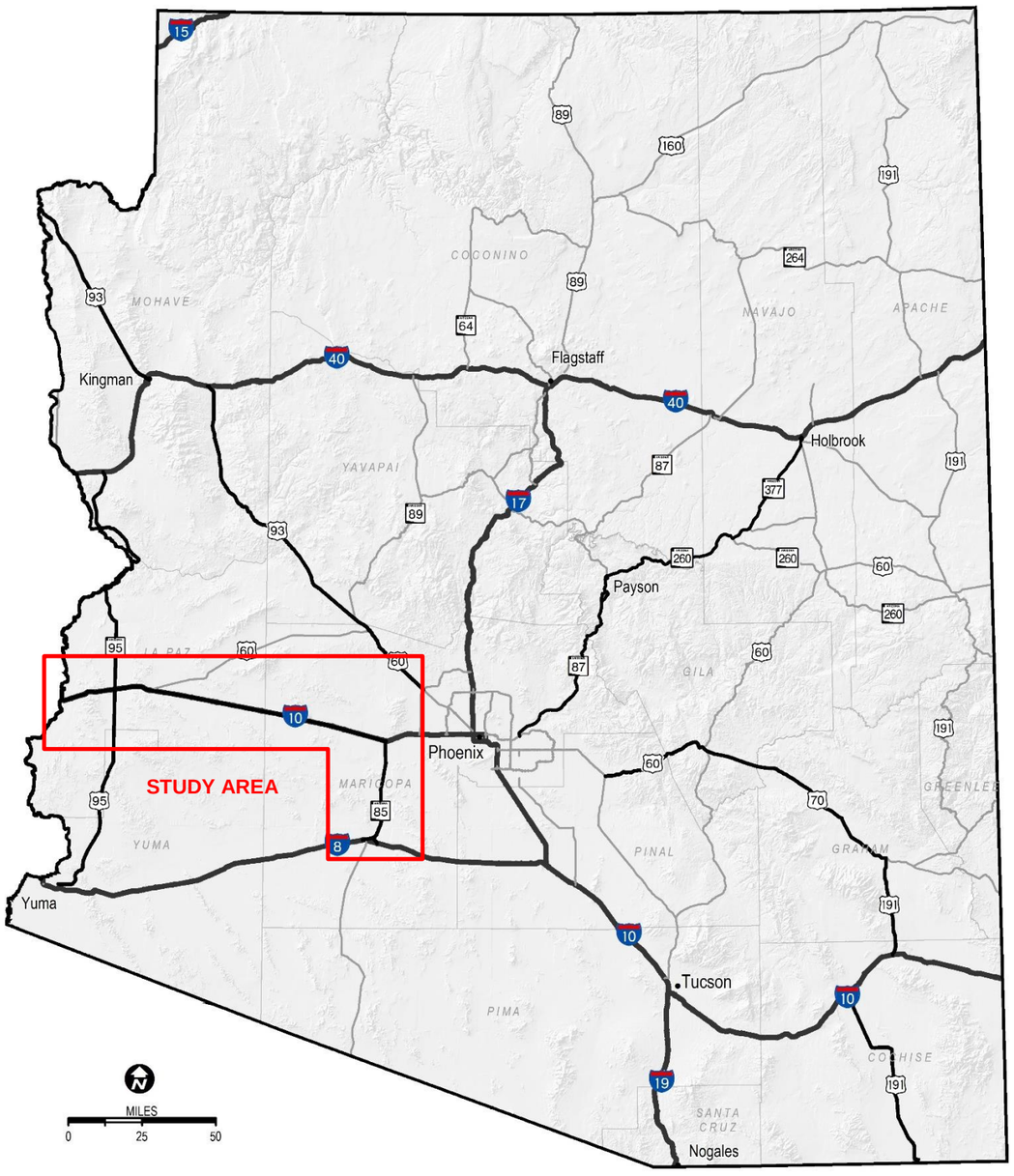
- I-8: California State Line to I-10
- I-40: I-17 to the New Mexico State Line
- SR 95: I-8 to I-40

The third round (Round 3) of studies, to be initiated in Fall 2015, include:

- I-10: California State Line to SR 85 and SR 85: I-10 to I-8
- I-10: SR 202L to the New Mexico State Line
- SR 87/SR 260/SR 377: SR 202L to I-40
- US 60/US 70: SR 79 to US 191 and US 191: US 70 to SR 80
- US 60/US 93: Nevada State Line to SR 303L

I-10/SR 85, California State Line to I-8, depicted in **Figure 1**, is one of the strategic statewide corridors and the subject of this Corridor Profile Study (**Round 3**).

Figure 1: Study Area



1.1 Corridor Study Purpose

The purpose of the Corridor Profile Study is to measure corridor performance to inform the development of strategic solutions that are cost-effective and account for potential risks. This purpose can be accomplished by following the process established by previous corridor profile studies to:

- Inventory past improvement recommendations.
- Define corridor goals and objectives.
- Assess existing performance based on quantifiable performance measures.
- Propose various solutions to improve corridor performance.
- Identify specific projects that can provide quantifiable benefits in relation to the performance measures.
- Prioritize projects for future implementation.

1.2 Corridor Study Goals and Objectives

The objective of this study is to identify a recommended set of prioritized potential projects for consideration in future construction programs, derived from a transparent, defensible, logical, and replicable process. The I-10/SR 85 Corridor Profile Study will define solutions and improvements for the corridor that can be evaluated and ranked to determine which investments offer the greatest benefit to the corridor in terms of enhancing performance.

The following goals have been identified as the desired outcome of this study:

- Link project decision-making and investments on key corridors to strategic goals.
- Develop solutions that address identified corridor needs based on measured performance.
- Prioritize improvements that cost-effectively preserve, modernize, and expand transportation infrastructure.

1.3 Working Paper 3 Overview

The purpose of Working Paper 3 is to establish the context of the I-10/SR 85 corridor, summarize the results of the corridor performance, and develop goals, objectives, and emphasis areas for the corridor.

The framework for measuring performance is based upon the five performance areas used to characterize the health of the I-10/SR 85 corridor: pavement, bridge, mobility, safety, and freight. The product of Working Paper 3 is the development of performance goals and objectives for the corridor against which baseline performance can be evaluated. Differences between baseline performance and performance goals and objectives provide the framework for defining corridor needs in the investment areas of preservation, modernization, and expansion.

1.4 Corridor Overview

The I-10/SR 85 provides an important connection from Southern California to economic and recreational opportunities in Central Arizona and other destinations to the east. I-10 is generally a 4-lane divided freeway from the California border to SR 85 while SR 85 is a two-lane highway facility connecting I-10 to I-8. Together, the two roadways provide a passage from Southern California to Tucson while bypassing the Metropolitan Phoenix Area.

Plans have been made to upgrade SR 85 to a freeway facility between I-10 and I-8, which will greatly increase accessibility for both freight and tourism travel. I-10 between California and SR 85 is a direct connection between Phoenix and Los Angeles. Similarly, SR 85 between I-10 and I-8 is both a bypass route for freight traffic wishing to avoid the Phoenix Area and a major corridor in the linkage between Phoenix and San Diego. Therefore, the entire corridor is considered an important connection for both freight and tourism travel in the state.

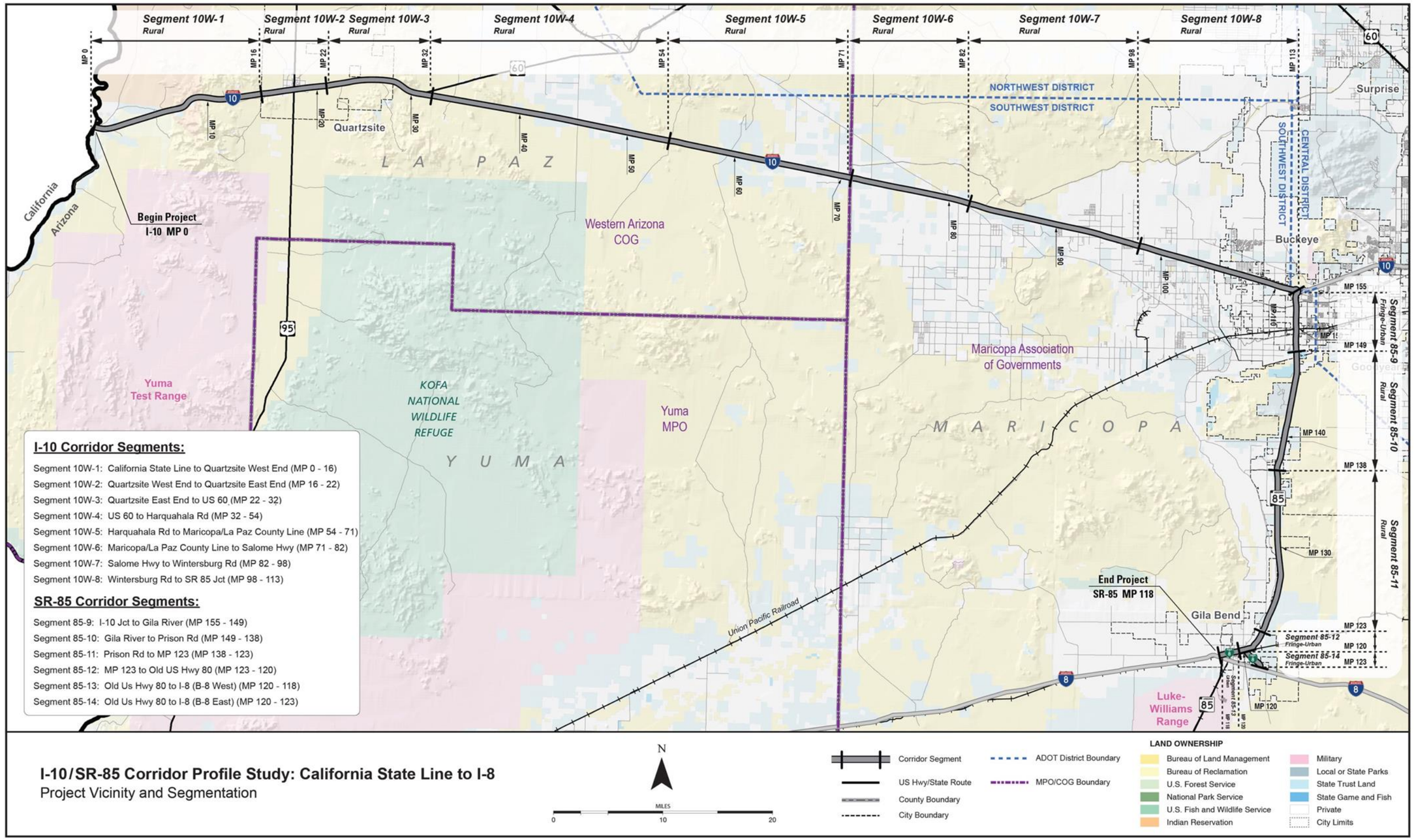
1.5 Study Location and Corridor Segments

The I-10/SR 85 Corridor extends from the California State Line (MP0) to SR 85 (MP 113) and from I-10 (MP 155) to I-8 (MP 118) on SR 85, which is approximately 150 miles**.** This corridor provides a bypass to downtown Phoenix from the south and west and connects I-10 and I-8. Identification of highway segments was determined based on roadway, traffic and jurisdictional characteristics to allow for the appropriate level of analysis for similar operating environments between segments. Fourteen segments have been identified as described in **Table 1** and illustrated in **Figure 2**. Based on team input and data collection, the segment limits may be adjusted as the study progresses.

Table 1: I-10/SR 85 Corridor Segmentation

Segment	Route	Begin	End	Approximate Begin Milepost	Approximate End Milepost	Approximate Length (miles)	Through Lanes (NB/EB, SB/WB)	2014 Average Annual Daily Traffic Volume (vpd)	Character Description
10W-1	I-10	California State Line	West Quartzsite	I-10 MP 0	I-10 MP 16	16	2 EB, 2 WB	16,000 - 20,000	This segment includes the Ehrenberg Port of Entry at milepost 3.8 which is a required checkpoint for commercial traffic entering Arizona. It is a four-lane divided section that has been classified as a rural operating environment.
10W-2	I-10	West Quartzsite	East Quartzsite	I-10 MP 16	I-10 MP 22	6	2 EB, 2 WB	16,000 - 21,600	This segment passes through Quartzsite and includes the I-10/SR 95 junction. It is six miles long and sustains consistent traffic volumes on a four-lane section.
10W-3	I-10	East Quartzsite	Jct US 60	I-10 MP 22	I-10 MP 32	10	2 EB, 2 WB	18,500 - 21,600	This segment is 10 miles long between the eastern border of Quartzite and the I-10/US 60 junction. It has been classified as a rural environment and it is mostly flat with traffic volumes 16,000 to over 20,000 vehicles per day.
10W-4	I-10	Junction US 60	Harquehala Rd	I-10 MP 32	I-10 MP 54	22	2 EB, 2 WB	20,400 - 21,500	This segment is 22 miles long between the US 60 junction and Harquehala Road. It is a four-lane section that has been classified as a rural environment.
10W-5	I-10	Harquehala Rd	La Paz/Maricopa County Border	I-10 MP 54	I-10 MP 71	17	2 EB, 2 WB	19,100 - 21,500	This segment runs from Eastern La Paz County to the Maricopa County border. It is 17 miles long and has been classified as a rural environment.
10W-6	I-10	La Paz/Maricopa County Border	Salome Rd	I-10 MP 71	I-10 MP 82	11	2 EB, 2 WB	19,100 - 20,500	This segment is 11 miles long, includes two general purpose lanes in each direction, and has been classified as a rural environment.
10W-7	I-10	Salome Rd	Wintersburg Rd	I-10 MP 82	I-10 MP 98	16	2 EB, 2 WB	20,500 - 25,500	This segment includes the Town of Tonopah. It is a four-lane section where traffic volumes begin to increase towards the east.
10W-8	I-10	Wintersburg Rd	I-10/SR 85 Interchange	I-10 MP 98	I-10 MP 113, SR 85 MP 155	15	2 EB, 2 WB	25,500 - 32,200	This segment is 15 miles long and includes the portion of I-10 that serves as a principal evacuation route for the Palo Verde Nuclear Generating Station, which is located six miles south of I-10. It is a four-lane section, it has been classified as a rural environment, and it has over 25,000 vehicles per day.
85-9	SR 85	I-10/SR 85 Interchange	Gila River (MP 149)	I-10 MP 113, SR 85 MP 155	SR 85 MP 149	6	2 EB, 2 WB	15,100 - 13,700	This segment is a four-lane section that connects I-10 south to the Gila River. It passes through the western portion on the Town of Buckeye and has been classified as a fringe urban operating environment.
85-10	SR 85	Gila River (MP 149)	Patterson Rd/ Prison Access	SR 85 MP 149	SR 85 MP 138	11	2 NB, 2 SB	15,100 - 8,900	This segment is 11 miles long and is a four-lane divided section. The southern limit provides direct access to the Arizona State Prison complex.
85-11	SR 85	Patterson Rd/ Prison Access	Gila Bend Limits	SR 85 MP 138	SR 85 MP 123	15	2 NB, 2 SB	8,900 - 10,600	This segment starts at the southern limits of Buckeye and ends at approximately the northern limits of Gila Bend. It is a four-lane divided section and has been classified as a rural environment.
85-12	SR 85	Gila Bend Limits	Jct B-8	SR 85 MP 123	SR 85 MP 120	3	2 NB, 2 SB	10,600 - 12,000	This segment transitions to one lane in each direction on a non-divided section. The speed limit drops entering into Gila Bend and this segment has been classified as fringe urban.
85-13	B-8	Jct B-8	Jct I-8 WB	SR 85 MP 120	B-8 MP 118	2	2 EB, 2 WB, 1 LT	9,300 – 11,500	This segment starts at SR 85 and transitions onto B-8 through Gila Bend. It is a five-lane arterial section with a dedicated left-turn lane. This segment provides direct access to commercial businesses within Gila Bend and acts as an arterial roadway.
85-14	B-8	Jct B-8	Jct I-8 EB	SR 85 MP 120	B-8 MP 123	3	1 NB, 1 SB	12,000 – 12,100	This segment starts at SR 85 and transitions onto S Butterfield Trail. It is a two lane non-divided section that provides access to I-8 without going through Gila Bend. Various commercial businesses have direct access to this segment as well.

Figure 2: Segmentation Map



2.0 CORRIDOR FUNCTIONALITY

The I-10/SR 85 corridor is an important travel corridor in the western part of the state. The corridor functions as a bypass route for Phoenix and carries significant traffic between Phoenix/Tucson and California.

2.1 National Context

I-10/SR 85 provides east-west connectivity from Arizona to California, and further east as a major corridor to the entire United States. It provides the most direct and fastest link between Phoenix and Los Angeles, and Southern Arizona and the port of Nogales to Los Angeles and the rest of California. Arizona is also uniquely positioned to connect export producers to three of the United States' largest consumer markets (Southern California, Dallas, and Houston), as well as the exponentially growing market in Northwest Mexico.

SR 85 connects I-8 with I-10 as a Phoenix bypass route for traffic traveling beyond Phoenix.

Another major consideration for this corridor is the role it plays in the CANAMEX system. CANAMEX is the name commonly used to describe a planned future roadway system that will connect Mexico to Canada through several U.S. states, Arizona included. The CANAMEX Corridor in Arizona is designated along I-10 from the Tucson area to I-8, west to SR 85, then along SR 85 between I-8 and I-10 to Wickenburg Road. From there the corridor will travel north through Wickenburg, eventually to Las Vegas and beyond. The I-10/SR 85 corridor constitutes a large portion of the Arizona CANAMEX system, making it an important route in interstate and international travel.

2.2 Regional Connectivity

I-10/SR 85 crosses the mostly rural terrain of Western Arizona. It provides the most direct and fastest link between Phoenix and the nation's largest two seaports, Los Angeles and Long Beach. I-10/SR 85 also connects to southern California via I-8, included in its own corridor profile study. The corridor offers a principal interstate highway link for freight traffic from the ports in California to the Southwest, eventually terminating on the East Coast in Jacksonville, Florida.

I-10/SR 85 is a key route for the regional production of Phoenix, Tucson, Los Angeles, San Diego, Dallas, and Houston—the 10th largest national economy in the world.

Total traffic volumes (AADT 2014) are approximately 16,000 to 32,000 throughout the length of the I-10 portion of corridor, where the daily volumes peak on either end. The traffic volumes for the SR 85 portion of the corridor are 10,000- 14,000. The Arizona Travel Demand Model (AZTDM) projects that traffic will more than double by 2035.

2.3 Commercial Truck Traffic

Arizona is a pass-through state for freight traffic coming from the ports of Los Angeles and Long Beach and going east to the central U.S. for distribution. ADOT conducted an extensive stakeholder outreach program during the Arizona Multimodal Freight Analysis Study. The I-10 corridor is designated as one of the six Corridors of the Future (COF) under a program sponsored by USDOT. This designation will expedite delivery of corridor improvements, where the I-10/SR 85 corridor is located.

SR 85, the popular Phoenix bypass route from I-10 to I-8 carries over 4,000 trucks per day, which is forecasted to exceed the capacity of the roadway before 2030.

The U.S. Department of Transportation, under Section 167(c) of title 23 United States Code (U.S.C.), created by Section 1115 of the Moving Ahead for Progress in the 21st Century Act (MAP–21), is directed to establish a National Freight Network (NFN) to assist States in strategically directing resources toward improved system performance for efficient movement of freight on the highway portion of the Nation's freight transportation system. I-10, a portion of the corridor, has been designated by ADOT as part of the National Primary Freight Network.

2.4 Commuter Traffic

Significant commuter traffic is present on I-10/SR 85, especially at the junction around segments 10-8 and 85-9, where peak travel times are congested due to commuters in and out of the Phoenix region. Traffic forecasts indicate that this segment will become severely congested by 2035 without capacity increases and other modifications to the current mainline. Other population centers along the corridor, including the California/Arizona border and Quartzsite, experience intra-city commuter traffic on the I-10/SR 85 to a much lesser degree. Segment 85-13 serves as Main Street in Gila Bend and an access route to many local businesses and residences.

Arizona Public Service (APS), a major utility company in the state, operates a large nuclear power station in Tonopah, located near segment 10-7. This major employment generator attracts commuter traffic to and from the east directions on the corridor.

2.5 Recreation and Tourism

Arizona offers a variety of recreational opportunities for its citizens as well as the millions of visitors that travel to the state in search of warmer weather, outdoor adventure, and exploration opportunities. Arizona's warm weather and natural beauty makes tourism one of the state's top industries. According to the Arizona Office of Tourism, in 2013, 33.8 million people visited Arizona who collectively spent $19.8 billion in the state, which supports jobs and generates tax revenue.

Recreation and tourism is a key industry along the corridor, especially in the Phoenix area. I-10 carries on east, and connects to I-17 the principal gateway to Northern Arizona and the Grand Canyon National Park, one of the most visited sites in the country, with over 4.7 million visitors last year. Phoenix offers many outdoor attractions and opportunities for travelers, such as Major League Baseball's Spring Training during March, which attracts a lot of California visitors whose teams train in the Phoenix Metropolitan region.

2.6 Multimodal Uses

The statewide emphasis is to create a multimodal transportation system. This means that, while the safety and mobility of travelers via motor vehicles will remain a primary concern, the overall focus will be widened to include greater attention to all relevant modes of travel, including freight and passenger rail, bicycles, pedestrians, bus, transit, and aviation. This section provides a review of the status of these varying modes of transportation on the I-10/SR 85 corridor.

2.6.1 Freight Rail

Union Pacific Railroad's Sunset Route is a 760-mile corridor between Los Angeles and El Paso that intersects the southern-most portion of the I-10/SR 85 Corridor in Gila Bend. The route then carries

on East to meet up and parallel the I-10 East, which is included in its own corridor profile study. As of 2007, the number of trains per day on the route was between 50 and 60[1].

Just south of the I-10/SR 85 junction is the Wellton Branch line of the Union Pacific Railroad. The track is currently out of service, however handles roughly 11,000 carloads of grain annually. Several improvements have been identified to reduce the impacts the at-grade crossing on the corridor would have on surrounding communities and traffic congestion.

2.6.2 Passenger Rail

The entire I-10 portion of the corridor, as well as segments 85-9 and 85-10 of the SR 85 portion are identified as potential routes in the Southwest Interstate High Speed Rail Corridor. There has been no planning yet, but prior studies indicate this as a potential key corridor.

2.6.3 Bicycles/Pedestrians

Interstate shoulders are built to design standards averaging 8-10 feet in width to accommodate cyclists on I-10/SR 85. There are no restrictions to bicycle use throughout this corridor.

2.6.4 Bus/Transit

Greyhound operates intercity bus transit the length of the I-10/SR 85 Corridor connecting Phoenix to Los Angeles via the I-10 portion of the corridor, and Phoenix to San Diego via the SR 85 portion of the corridor to I-8. Local transit service by Valley Metro operates rural routes connecting Gila Bend to Phoenix via SR 85.

2.6.5 Aviation

There is one airport along the I-10/SR 85 Corridor, the Gila Bend Municipal Airport. The airport is located in Gila Bend and is a public use airport.

2.7 Traveler Amenities

ADOT operates three rest areas along the I-10/SR 85 Corridor available for both commercial and non-commercial vehicles, and all three are located on the I-10 portion of the corridor. Burnt Well Rest Area is located at Mile Marker 86 near Tonopah, Bouse Wash Rest Area is located at Mile Marker 52 near Salome, and Ehrenberg Rest Area is located at Mile Marker 1 in Ehrenberg near the California/Arizona Border.

Dynamic Message Signs (DMS) provide various types of information to travelers in real time. ADOT operates DMS's at the following locations on the I-10/SR 85 corridor:

- Eastbound, between Ehrenberg and Quartzsite at MP 15.60
- Eastbound near Bouse Wash Rest Area at MP 49.40
- Eastbound near Buckeye at MP 110.30

2.8 Tribes

The Colorado River Indian Tribes (CRIT) includes the Mohave, Chemehuevi, Hopi, and Navajo tribes, and is primarily located in Parker, Arizona. Parker is located about 40 minutes north of the corridor; however the land owned by the tribe extends to portions of segment 10-1 of the corridor. The CRIT encompasses the length of the Colorado River on both sides of Arizona and California. *(Source: https://en.wikipedia.org/wiki/Navajo_Nation)*

2.9 Jurisdictions, Population Centers, and Major Traffic Generators

As shown in **Figure 2**, I-10/SR 85 crosses multiple jurisdictions and land holdings throughout Maricopa and La Paz Counties. A majority of the land surrounding the corridor in segments 10-1 through 10-5 is owned by the Bureau of Reclamation, with sporadic clusters of State Trust Land and Private ownership. A small part of segment 10-1 crosses through a bit of land owned by an Indian Reservation. A majority of the land between segments 10-5 and 10-8 is a checker board of State Trust Land and Private Ownership, where Segment 10-8 is also part of Buckeye City Limits. All of segment 85-9 is within Buckeye City Limits, and segments 85-12, 85-13, and 85-14 are within Gila Bend City Limits. Portions of segments 85-10 and 85-11 contain land owned by The Bureau of Reclamation, State Trust Land, and Private Ownership.

2.9.1 Population Centers

The I-10/SR 85 Corridor, through two counties, is mostly rural. There are three major population centers along the corridor in Buckeye, Gila Bend and Quartzsite. Significant growth is projected to continue in the Buckeye and Gila Bend areas. **Table 2** shows current (2014) population by county and city along with projected future (2040) population and growth.

[1] Source: Arizona State Rail Plan (2011), Appendix A

Table 2: Current and Future Population

Area	2010 Population	2015 Population	2040 Population	% Change 2010-2040	Total Growth
La Paz County	**20,489**	**20,231**	**23,530**	15%	**3,041**
Parker	3,083	3,044	3,057	-1%	-26
Quartzsite	3,677	3,881	5,904	61%	2,227
Unincorporated	13,729	14,020	14,569	6%	840
Maricopa County	**3,817,117**	**4,087,191**	**6,030,950**	**58%**	**2,213,833**
Avondale	76,238	79,646	128,400	68%	52,162
Buckeye	50,876	59,470	251,100	394%	200,224
Carefree	3,363	3,526	4,400	31%	1,037
Cave Creek	5,015	5,253	8,400	67%	3,385
Chandler	236,123	254,276	301,400	28%	65,277
El Mirage	31,797	33,532	47,400	49%	15,603
Fountain Hills	22,489	23,573	31,200	39%	8,711
Gila Bend	1,922	2,001	14,500	654%	12,578
Gilbert	208,453	239,277	315,400	51%	106,947
Glendale	226,721	237,517	307,900	36%	81,179
Goodyear	65,275	75,664	226,200	247%	160,925
Guadalupe	5,523	6,106	6,800	23%	1,277
Litchfield Park	5,476	5,392	8,200	50%	2,724
Mesa	439,041	464,704	581,800	33%	142,759
Paradise Valley	12,820	13,663	14,500	13%	1,680
Peoria	154,065	166,934	303,000	97%	148,935
Phoenix	1,445,632	1,537,058	2,116,900	46%	671,268
Scottsdale	217,385	230,512	296,300	36%	78,915
Surprise	117,517	126,275	280,500	139%	162,983
Tempe	161,719	172,816	271,500	68%	109,781
Tolleson	6,545	6,929	8,900	36%	2,355
Wickenburg	6,363	6,685	15,700	147%	9,337
Youngtown	6,156	6,542	7,600	23%	1,444
Unincorporated	310,603	329,840	482,950	55%	172,347

Source: U.S. Census, Arizona Department of Administration – Employment and Population Statistics

2.9.2 Major Traffic Generators

Much of the traffic on I-10/SR 85 results from interstate commercial and long distance personal travel. The Phoenix Metropolitan region generates high volumes of traffic locally, and Southern California serves as a popular vacation destination for Arizona residents. I-10 serves as the principal gateway to the region, connecting travelers to I-17, a route to two of the state's largest tourist spots, Sedona and the Grand Canyon, and carries on to I-10 East, a major interstate route connecting major cities across the entire country. SR 85 serves as a bypass route to Southern California via I-8 for those in the Western Phoenix Metropolitan region, as well as a truck by-pass route from the east wishing to avoid the Phoenix region traffic.

The Palo Verde Nuclear Generating Station, operated by APS, constitutes a major employment traffic generator for commuter traffic. The power station is located near Tonopah, 45 miles west of downtown Phoenix, and is the largest power plant in the United States. The power station attracts commuter traffic mostly from the east.

2.10 Wildlife Linkages Considerations

The Arizona Game and Fish Department published the Arizona State Wildlife Action Plan (SWAP) in 2010. This SWAP provides a 10-year vision for achievement, subject to adaptive management and improvement along the way. The plan covers the entire state, identifying wildlife and habitats in need of conservation, insight regarding the stressors to those resources, and suggests actions that can be taken to alleviate those stressors.

Using the Habimap Tool that creates an interactive database of the information included in the SWAP, the following were identified in relation to the I-10/SR 85 corridor:

- Wildlife waters to the north and south of I-10 just east of Quartzsite.
- I-10/SR 85 travels through the Sonoran Desert National Monument allotments from the California State line to segment 10-5 to and segments 85-10 and 85-11.
- Gila River is designated as a Riparian, which intersects the SR 85 portion of the corridor at segment 85-9.
- Species of Greatest Conservation need are identified continuously along the entire corridor, and increases at the intersection of SR 85 and the Gila River near segment 85-9.
- A high level of Species of Economic and Recreational Importance are identified along the entire SR 85 portion of the corridor. A low level is identified throughout the corridor from the California State Line along I-10 to the SR 85 junction.

2.11 Transportation Assets

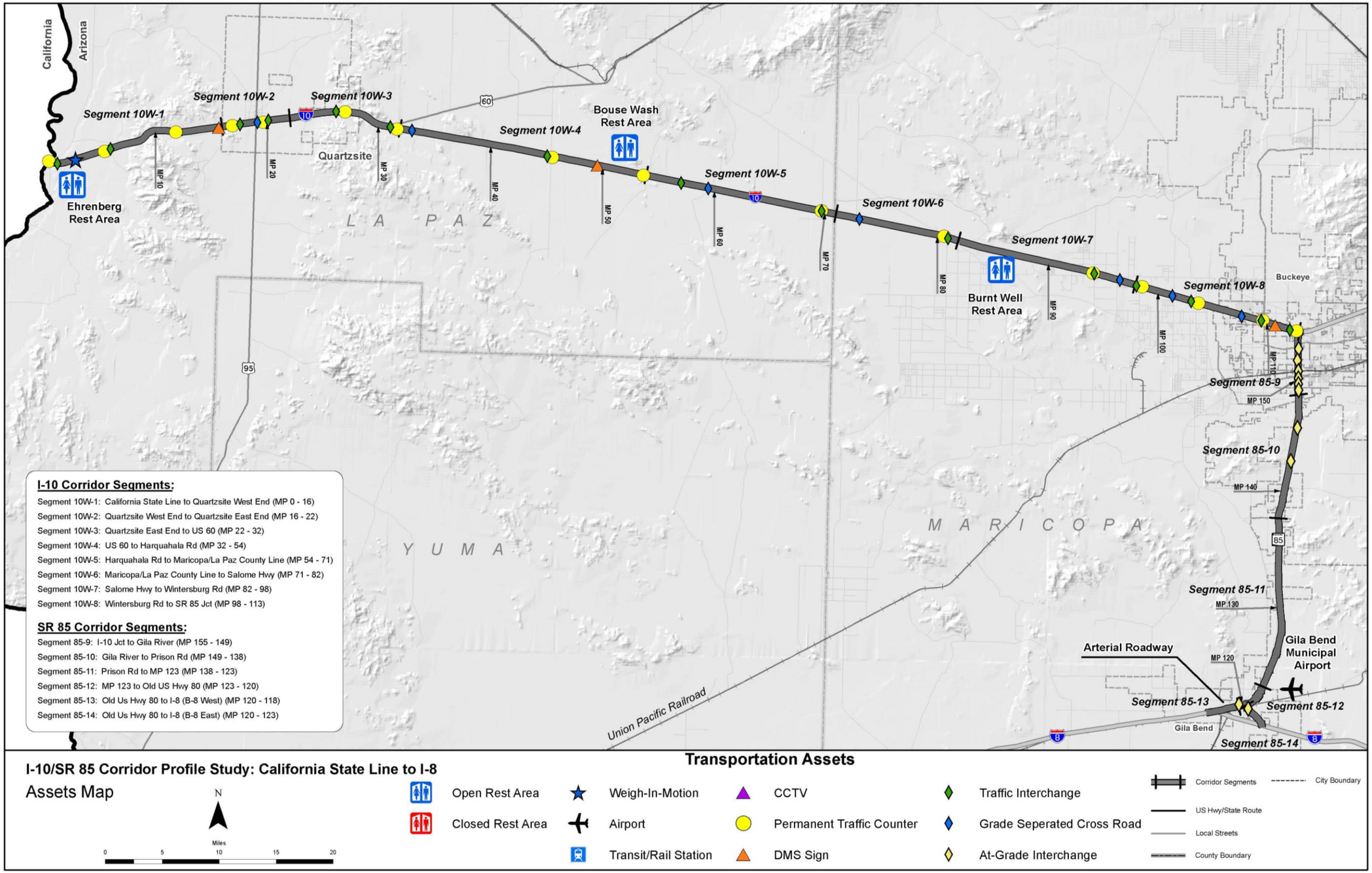
Corridor transportation assets are summarized in **Figure 3**.

A freight weigh station is located near the California border in Ehrenberg, Arizona. There are seven grade separated road crossings on the corridor, fifteen traffic interchanges along the corridor, and twenty-two at-grade interchanges—the majority located in segment 85-13 due to it serving as Gila Bend's Main Street. There are sixteen permanent traffic counters located along the I-10/SR 85 corridor.

2.12 Conclusion of Corridor Characteristics

The I-10/SR 85 Corridor serves a major role for interstate commercial and passenger trips. Most of the corridor is sparsely populated and contributes little to total volumes. The corridor is identified by ADOT as a Strategic Corridor, connecting California to points across the southwestern United States. Along with I-8 and I-40, the I-10/SR 85 Corridor is a cornerstone in the State's economy. Phoenix, the largest city in Arizona is a growing metropolitan region with significant contribution to the travel volumes in the corridor, both commuting and bypassing.

Figure 3: Transportation Assets



3.0 SUMMARY OF CORRIDOR PERFORMANCE

A system to establish baseline corridor performance was developed through a collaborative process with ADOT, the Technical Advisory Committee (TAC) and the corridor teams for the profile studies. Baseline performance was evaluated using primary and secondary performance measures to define the corridor health and identify locations warranting further analysis to define needs. Corridor needs constitute the difference between baseline corridor performance and performance objectives.

The performance system consists of five areas: Pavement, Bridge, Mobility, Safety, and Freight. For each of these performance areas, a primary measure – known as the Index – was defined along with a set of secondary measures that allows for a more detailed analysis of corridor performance. **Table 3** lists the primary and secondary measures that were evaluated for each of the five performance areas.

Working Paper 2 evaluated the overall corridor performance (as a weighted average by segment length) and individual segment performance in the five aforementioned areas. The primary and secondary performance measures were quantified where feasible. A scale for each measure was developed based on adopted ADOT thresholds, where applicable, or on statistical analysis of statewide datasets. The scaling is split into three levels, each of which is represented by a corresponding color. The scale levels are named “good” (green), “fair” (yellow), and “poor” (red), except for measures based on a comparison to statewide averages (e.g., the Safety performance area) where the levels are called “above average” (green), “average” (yellow), and “below average” (red). Some of the secondary measures are “hot spots” that cannot be readily quantified at a segment or overall corridor level, so no scaling was developed for “hot spots”.

Good / Above Average Performance
Fair / Average Performance
Poor / Below Average Performance

The corridor weighted average ratings are summarized in **Figure 4**, which also provides a brief description of each performance measure. **Figure 5** shows the corridor and segment performance for each primary measure. The following sub-sections summarize the measured performance in each performance area according to the analysis findings documented in Working Paper 2.

Table 3: Performance Measures

Performance Index	Primary Measures	Secondary Measures
Pavement	**Pavement Index** (based on a combination of International Roughness Index and Cracking)	• Directional Pavement Serviceability • Pavement Failure • Pavement Hot Spots
Bridge	**Bridge Index** (based on Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating)	• Bridge Sufficiency Rating • Functionally Obsolete Bridges • Bridge Rating • Bridge Hot Spots
Mobility	**Mobility Index** (based on combination of Current V/C and Future V/C)	• Existing Directional Peak Hour Volume/Capacity Ratio (V/C) • Future Daily V/C • Directional Travel Time Index (TTI) • Directional Planning Time Index (PTI) • Directional Road Closure Frequency • Non-Single Occupancy Vehicle Trips • Bicycle Accommodation
Safety	**Safety Index** (based on frequency of fatal and incapacitating injury crashes)	• SHSP Emphasis Areas • Crash Unit Types • Directional Safety Index • Safety Hot Spots
Freight	**Freight Index** (based on Truck Planning Time Index)	• Directional Truck Travel Time Index (TTTI) • Directional Truck Planning Time Index (TPTI) • Directional Road Closure Duration • Bridge Vertical Clearance • Bridge Clearance Hot Spots

Figure 4: Performance Summary

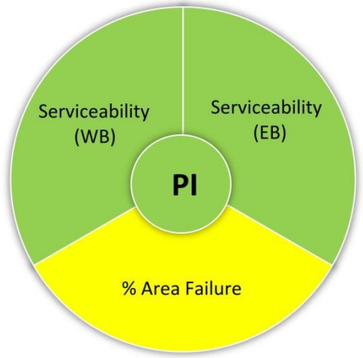
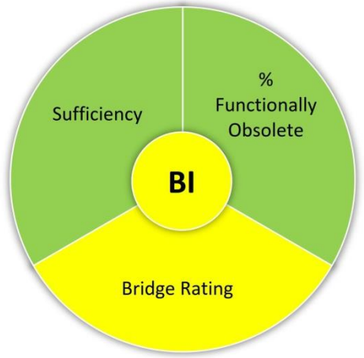
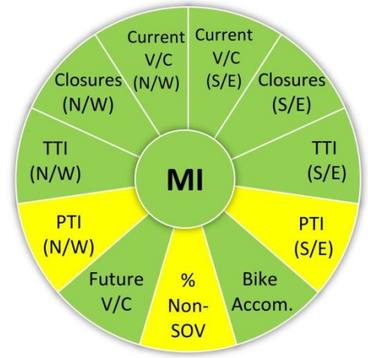
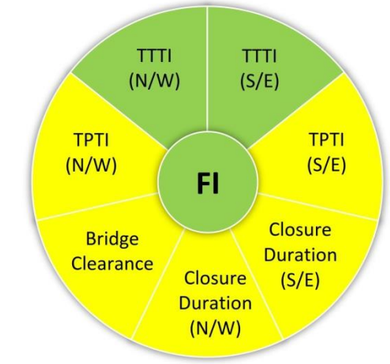
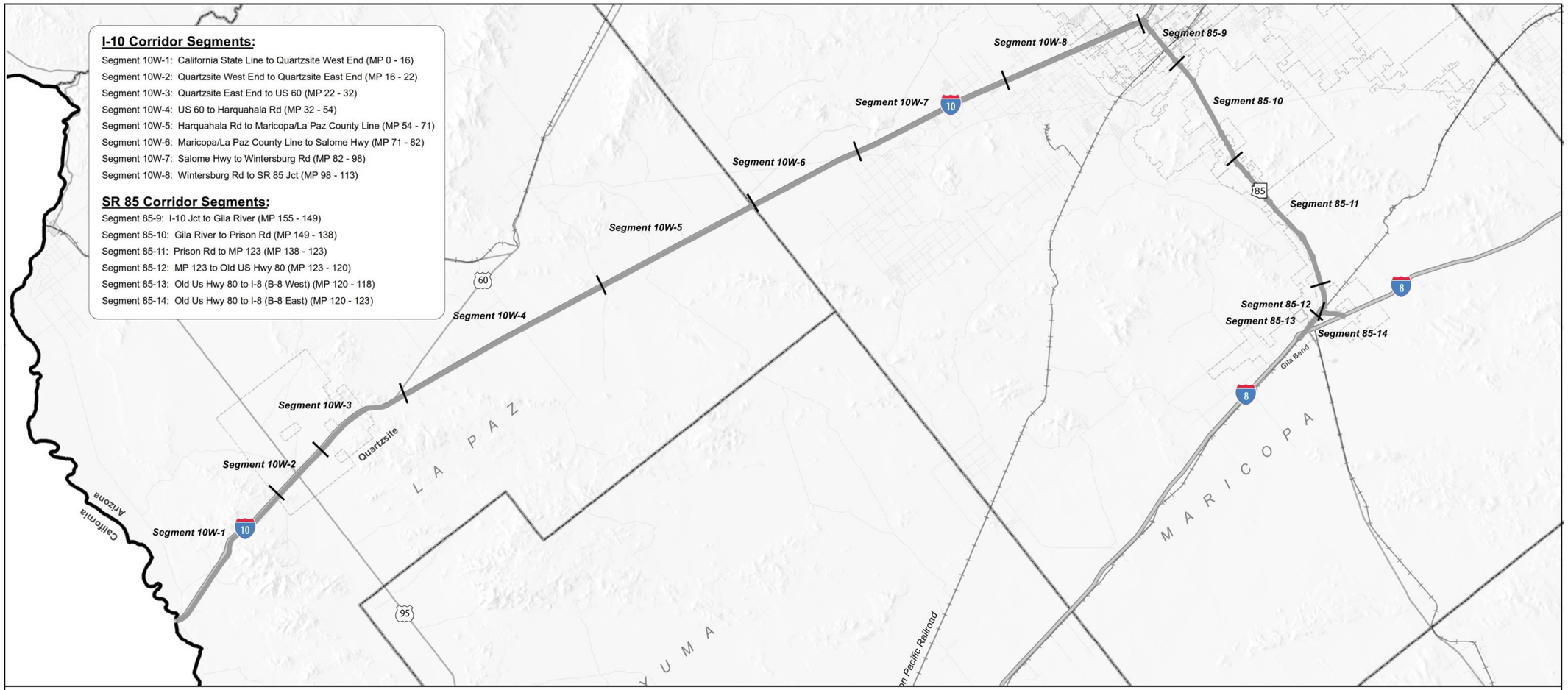
Pavement	Bridge	Mobility	Safety	Freight
				
Pavement Index (PI): based on two pavement condition ratings from the ADOT Pavement Database. The two ratings are the International Roughness Index (IRI) and the Cracking Rating. The calculation of the Pavement Index uses a combination of these two ratings.	**Bridge Index (BI):** based on four bridge condition ratings from the ADOT Bridge Database. The four ratings are the Deck Rating, Substructure Rating, Superstructure Rating, and Structural Evaluation Rating.	**Mobility Index (MI):** an average of the current volume-to-capacity (V/C) ratio and the projected 2035 V/C ratio.	**Safety Index (SI):** combines the bi-directional frequency and rate of fatal incapacitating injury crashes, compared to crash occurrences on similar roadways in Arizona.	**Freight Index (FI):** a reliability performance measure based on the bi-directional planning time index for truck travel.
➢ **Directional Pavement Serviceability** – the weighted average (based on number of lanes) rating which measures the condition of the pavement in each direction of travel. ➢ **Pavement Failure** – the percentage of pavement area that is rated above the failure thresholds for IRI or Cracking, as established by ADOT Materials Group (IRI > 105 or Cracking > 15).	➢ **Sufficiency** – indicative of bridge sufficiency to remain in service. The factors that contribute to the Sufficiency Rating include structural adequacy and safety, serviceability and functional obsolescence, and essentiality for public use. ➢ **% Functionally Obsolete** – indicative of the percentage of deck area on bridges that is no longer functionally adequate for its current use, such as lack of shoulders or the inability to handle current traffic volumes. Functionally Obsolete does not directly relate to the structural adequacy. ➢ **Bridge Rating** – identifies the lowest rating on each segment.	➢ **Directional Current V/C** – the existing peak hour V/C ratio in both directions of the corridor. This measure provides an understanding of the directional operating characteristics of the corridor during the existing peak hour from a mobility congestion standpoint. ➢ **Future V/C** – a measure of the future 2035 V/C ratio that identifies how the corridor will operate in the future from a mobility congestion standpoint. ➢ **Directional Closures** – the average number of times a given location in the corridor was closed per mile in a specific direction of travel per year. ➢ **Directional Travel Time Index (TTI)** – the ratio of the average peak period travel time to the free-flow travel time. The TTI represents recurring delay along the corridor. ➢ **Directional Planning Time Index (PTI)** – the ratio of the total travel time needed for 95 percent on-time arrival to free-flow travel time. The PTI represents non-recurring delay along the corridor. ➢ **% Non-single Occupancy Vehicle Trips (Non-SOV)** – represents the percentage of trips that are taken by vehicles carrying more than one occupant. ➢ **Bicycle Accommodation** – represents the percentage of roadway that is accommodating for bicycle travel.	➢ **% SHSP Emphasis Area** – the percentage of fatal and incapacitating crashes that involve at least one of the five Strategic Highway Safety Plan (SHSP) Emphasis Areas on a given segment compared to the statewide average percentage of crashes involving at least one of the five SHSP Emphasis Areas on roads with similar operating environments. ➢ **Directional Safety Index** – the combination of the directional frequency and rate of fatal incapacitating injury crashes, compared to crash occurrences on similar roadways in Arizona. ➢ **% SHSP Crash Unit Types** – the percentage of total fatal and incapacitating injury crashes that involves a given crash unit type (motorcycle, truck, non-motorized traveler) is compared to the statewide average percentage on roads with similar operating environments.	➢ **Directional Truck Planning Time Index (TPTI)** – the ratio of total travel time (for trucks only) needed for 95 percent on-time arrival to free-flow travel time. The TPTI represents non-recurring delay along the corridor. ➢ **Directional Truck Travel Time Index (TTTI)** – the ratio of the average peak period travel time (for trucks only) to the free-flow travel time. The TTTI represents recurring delay that occurs along the corridor. ➢ **Directional Closure Duration** – the average time a given location in the corridor was closed per mile per year. ➢ **Bridge Clearance** – the minimum vertical clearance for all underpass structures within each segment as determined via the ADOT Bridge Database.

Figure 5: Performance Index Summary



PERFORMANCE SUMMARY TABLE

	10W-1	10W-2	10W-3	10W-4	10W-5	10W-6	10W-7	10W-8	85-9	85-10	85-11	85-12	85-13	85-14	Weighted Average
Pavement	3.76	3.61	3.90	3.76	4.37	3.85	3.95	3.95	4.01	3.83	3.80	3.32	No Data		3.89
Bridge	5.11	5.92	6.00	6.50	6.48	7.00	6.25	6.71	No Bridges	6.53	No Bridges	5.00	5.21	6.57	6.25
Mobility	0.27	0.30	0.27	0.31	0.29	0.29	0.32	0.53	0.30	0.23	0.17	0.92	0.32	1.01	0.33
Safety	0.76	0.99	1.03	1.79	1.60	1.66	2.60	1.05	3.12	0.54	0.26	0.11	0.17	0.00	1.31
Freight	0.71	0.89	0.89	0.90	0.87	0.90	0.88	0.90	0.66	0.73	0.65	0.60	0.14	0.17	0.80

PERFORMANCE INDEX SCALE
Above Average, Good
Average, Fair
Below Average, Poor

I-10/SR 85 Corridor Profile Study: California State Line to I-8
Performance Index Summary

3.1 Pavement

Based on the weighted average of the Pavement Index, the pavement on the corridor is in “good” condition. Overall, according to the Pavement Index, nearly all sections of the pavement are in “good” condition.

There are several failure hot spots along the corridor in segments 10-1, 10- 4, 10-6, and 10-8, 85-10, 85-11 and 85-12. These hot spots were identified using methods described in Working Paper 2. 27% of the pavement in segment 4 is in “poor” condition. The eastbound and westbound pavements are mostly all in “good” condition, with the exception of segments 10-4, 10-6, 10-8 (NB), and 85-12 showing “fair” condition. There is not enough data to accurately display the condition of pavement in segments 85-13 and 85-14.

3.2 Bridge

Overall, based on the weighted average of the Bridge Index the corridor is performing “fair”. Over half of the segments are in “fair” condition, while there are only 5 segments performing in “good” condition.

There are no bridges designated as structurally deficient along the corridor. There are eight bridges with a rating of 5 along the corridor, none of which have multiple 5 ratings.

There are no bridges with a sufficiency rating of “poor”, and only 3 bridges rate as functionally obsolete throughout the entire corridor. There are no bridge hotspots located along I-10/SR 85, and additionally there are no bridges at all in segments 85-9 and 85-11.

3.3 Mobility

A thorough analysis of mobility on the corridor is described in Working Paper 2. Based on the overall weighted average of the Mobility Index, the traffic operations on the corridor are in “good” condition. The existing peak hour traffic operations are “good,” as well. The future traffic operations are anticipated to perform “poor” in two of the fourteen segments – segments 12 and 14. Not only do segments 85-12 and 85-14 perform the worst in the Future V/C performance measure, but they also have the highest Mobility Indices.

Half of the segments show “fair” performance in the Closure performance, and segment 9 has the highest number of closures. The Travel Time Index (TTI) measures generally show “good” along the corridor, except four segments, where two show “fair”, and two show “poor”. Half of the segments in the Travel Planning Time Index (PTI) measures show “poor” condition.

A majority of the corridor displays “poor” or “fair” performance for non-SOV trips, meaning that many vehicles on the corridor carry only a single occupant. Most of the segments show a “good” performance for accommodation of bicycles with the exception of a “fair” rating in segment 85-9, and “poor” ratings in segments 85-12, 85-13, and 85-14.

3.4 Safety

The weighted average of the Safety Index for the corridor as a whole shows a “below average performance” condition. The segments are about divided evenly among the three rating performances, where 5 segments perform “above average”, 4 are “average” performance, and 5 are “below average performance”.

Segment 10-4 performs below average in the Safety Index, top 5 SHSP emphasis areas, and both directions of travel for the directional safety index. There are several locations of high crash frequency, including eastbound/southbound in segments 10-4 through 10-9, and northbound/westbound in Segments 10-2, 10-4, 10-7, and 85-9. These locations are identified using methodologies described in Working Paper 2. All segments on the SR 85 portion of the corridor lacked adequate data to provide an accurate performance score in top 5 SHSP emphasis areas and % of fatal and incapacitating injury crashes involving trucks.

3.5 Freight

Based on results found in Working Paper 2, the overall weighted average of the Freight Index shows that the corridor is in “good” condition. Slightly more than half of the segments show “good” performance in the Freight Index, and the majority show “good” performance in the directional TTTI and TPTI. The majority of the segments along the SR 85 portion of the corridor show “poor” or “fair” condition for TTTI and TPTI.

A majority of the segments show “good” performance in the closure performance measure. Segments 10-4, 10-6, 10-7, 85-9, and 85-10 have the longest durations of closures. There are two locations along the corridor that have a vertical clearance restriction that cannot be by-passed using ramps, Ramsey Mine Road UP (MP 33) and 355th Avenue UP (MP 101).

4.0 CORRIDOR PERFORMANCE GOALS AND OBJECTIVES

The I-10/SR 85 Corridor from California State Line to I-8 is and will continue to be a major transportation corridor for interstate and intrastate commerce, intercity travel and tourism. ADOT has designated this section of I-10/SR 85 as a Strategic Corridor and as part of the National Primary Freight Network. The performance goals for the I-10/SR 85 corridor include the following key points:

- Meet goals and vision of Long-Range Transportation Plan and bqAZ
- Enhance safety
- Maintain and preserve highway infrastructure
- Provide reliable route for tourist travel
- Provide efficient commuting route within the Phoenix metropolitan area
- Provide reliable route for interstate and intrastate freight traffic
- Provide efficient by-pass route around Phoenix

Statewide goals and performance measures were established by the ADOT *Long-Range Transportation Plan* (LRTP), 2010-2035. Statewide performance goals that are relevant to the I-10/SR 85 performance framework areas were identified and corridor objectives were then formulated for each of the five performance framework areas that aligned with the overall statewide goals established by the LRTP. **Table 4** shows the I-10/SR 85 corridor performance objectives and how they align with the statewide goals; the corridor objectives are also detailed below:

- Reduce current and future congestion
- Reduce delays from non-recurring events and incidents to enhance travel time reliability
- Reduce delays and restrictions to freight movements and improve travel time reliability
- Reduce the number of structurally deficient bridges
- Maintain acceptable level of pavement ride quality
- Reduce fatal and serious injury crashes

4.1 Stakeholder Input

The study team met with stakeholders at a meeting with the Southwest District in Yuma at the ADOT office. The meeting was held to discuss the results of the performance evaluation in Working Paper 2, as well as to help develop the goals and objectives for the corridor. A summary of these meetings in regards to the goals and objectives is presented in the subsequent section. Feedback provided on the I-10/SR 85 corridor performance evaluation was documented in Section 5.0 of the Working Paper 2.

Southwest District

The Southwest District meeting was held on March 7, 2016 and included participants from the ADOT Southwest District, ADOT Multimodal Planning Division, and the consultant team. Comments from the meeting include the following:

- Everyone generally agreed with all performance system results
- Representatives from ADOT noted the importance of leaving Segments 85-13 and 85-14 (B-8) in the study for future projects and improvements to the corridor

4.2 Performance Emphasis Areas

Based on information from the ADOT Districts, MPOs, and COGs, Mobility, Safety, and Freight Areas were identified as critical performance areas for I-10/SR 85. As such, the corridor objectives shown in **Table 4** reflect an emphasis in these three performance areas.

4.3 Performance Objectives

Taking into account the corridor performance goals and identified “emphasis areas”, performance objectives were developed for each quantifiable performance measure that identify the desired level of performance based on the performance scale levels for the overall corridor and for each segment of the corridor. The performance objectives within each of the five performance areas are shown in **Table 4**.

The colors shown in **Table 4** represent the corresponding level of performance as described earlier, with green indicating “good” or “above average” performance and yellow indicating “fair” or “average” performance, and red indicating “poor” performance. Good/above average performance is the desired level of performance for the overall corridor primary measure for performance areas designated as “emphasis areas”.

Table 4: Performance Goals and Objectives

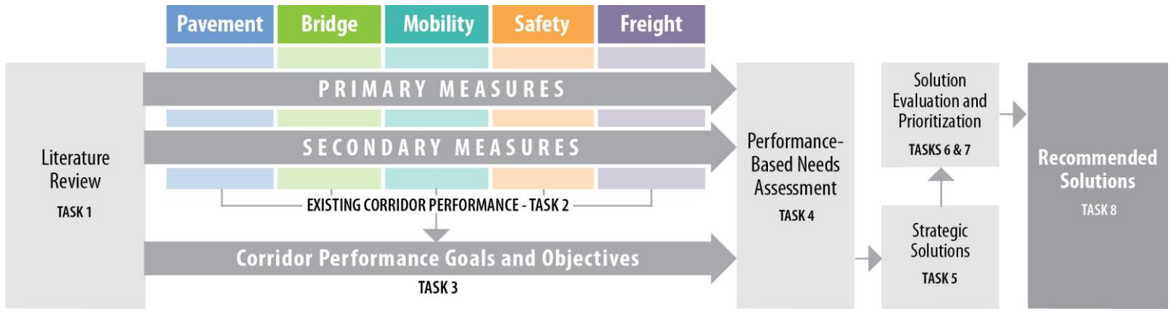
ADOT Statewide LRTP Goals	I-10/SR 85 Corridor Goals	I-10/SR 85 Corridor Objectives	Performance Area	Performance Measure	Performance Objective	
					Corridor Average	Segment
Improve Mobility and Accessibility	Provide reliable route for tourist travel Provide efficient community route within the Phoenix metropolitan area Provide efficient bypass route to/from I-10	Reduce Current and Future Congestion	Mobility (*Emphasis Area*)	Mobility Index	Good	Fair or better
				Existing Directional Peak Hour V/C		Fair or better
				Future Daily V/C		Fair or better
		Reduce delays from recurring and non-recurring events to improve reliability, especially in Payson and Holbrook		Directional Closure Frequency		Fair or better
				Directional Travel Time Index		Fair or better
				Directional Planning Time Index		Fair or better
				Percent Non-SOV Trips		Fair or better
				Percent Bicycle Accommodation		Fair or better
Support Economic Growth	Provide reliable route for interstate and intrastate freight traffic	Reduce delays and restrictions to freight movement and improve travel time reliability	Freight *(Emphasis Area)*	Freight Index	Good	Fair or better
				Directional Truck Travel Time Index		Fair or better
				Directional Truck Planning Time Index		Fair or better
				Directional Closure Duration		Fair or better
				Bridge Vertical Clearance		Fair or better
Preserve and Maintain the State Transportation System	Maintain and preserve highway infrastructure	Reduce the number of structurally deficient bridges	Bridge	Bridge Index	Fair or better	Fair or better
				Bridge Sufficiency Rating		Fair or better
				Bridge Rating		Fair or better
				Percent Deck Area on Functionally Obsolete Bridges		Fair or better
		Maintain acceptable level of pavement ride quality	Pavement	Pavement Index	Fair or better	Fair or better
				Directional Pavement Serviceability		Fair or better
				Percent Pavement Area Failure		Fair or better
Enhance Safety and Security	Enhance safety	Reduce fatal and serious injury crashes	Safety *(Emphasis Area)*	Safety Index	Above Average	Fair or better
				Percent SHSP Emphasis Areas		Fair or better
				Directional Safety Index		Fair or better
				Crash Unit Type		Fair or better

5.0 NEXT STEPS

The overall Corridor Profile Study process is shown in **Figure 6**. The process consists of eight tasks where the final results will provide candidate projects for P2P prioritization and inform the LRTP Update. The next step in the I-10/SR 85 Corridor Profile Study will be to conduct a needs assessment based on the relationship between the existing performance and the desired performance (Task 4). The corridor team will compare measured performance completed in Task 2 to the Corridor Objectives and Goals identified in this Working Paper 3 (Task 3). A "need" is identified when measured performance does not meet the expected performance objective.

The next deliverable, Working Paper 4, will report the findings from a needs analysis to help identify strategic improvements. The needs analysis will take a detailed look at the available data sets for each of the primary and secondary performance measures (including the "hot spots"). Following the needs assessment, "solution sets" will be developed to address the identified needs and improve performance (Task 5).

Figure 6: Profile Study Process



Task 1 assesses work already completed in the corridor through a literature review

Task 2 determines existing corridor performance based on data collected for the identified performance areas (pavement, bridge, mobility, safety and freight)

Task 3 develops a long-term goals and objectives that define how the corridor can be expected to function, its primary purpose and performance emphasis areas

Task 4 assesses corridor needs by comparing existing conditions to expected performance

Task 5 formulates solutions to raise performance levels throughout the corridor with a focus on high need areas

Task 6 uses life-cycle cost analysis and benefit-cost analysis to determine the most cost effective solution option

Task 7 determines performance effectiveness and risk factors for use in prioritizing solutions

Task 8 describes the recommended solutions using pre-scoping reports for future use in programming projects